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Skills Practice**Operations on Functions**

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$.

1. $f(x) = x + 5$

$g(x) = x - 4$

2. $f(x) = 3x + 1$

$g(x) = 2x - 3$

3. $f(x) = x^2$

$g(x) = 4 - x$

4. $f(x) = 3x^2$

$g(x) = \frac{5}{x}$

For each set of ordered pairs, find $f \circ g$ and $g \circ f$ if they exist.

5. $f = \{(0, 0), (4, -2)\}$

$g = \{(0, 4), (-2, 0), (5, 0)\}$

6. $f = \{(0, -3), (1, 2), (2, 2)\}$

$g = \{(-3, 1), (2, 0)\}$

7. $f = \{(-4, 3), (-1, 1), (2, 2)\}$

$g = \{(1, -4), (2, -1), (3, -1)\}$

8. $f = \{(6, 6), (-3, -3), (1, 3)\}$

$g = \{(-3, 6), (3, 6), (6, -3)\}$

Find $[g \circ h](x)$ and $[h \circ g](x)$.

9. $g(x) = 2x$

$h(x) = x + 2$

10. $g(x) = -3x$

$h(x) = 4x - 1$

11. $g(x) = x - 6$

$h(x) = x + 6$

12. $g(x) = x - 3$

$h(x) = x^2$

13. $g(x) = 5x$

$h(x) = x^2 + x - 1$

14. $g(x) = x + 2$

$h(x) = 2x^2 - 3$

If $f(x) = 3x$, $g(x) = x + 4$, and $h(x) = x^2 - 1$, find each value.

15. $f[g(1)]$

16. $g[h(0)]$

17. $g[f(-1)]$

18. $h[f(5)]$

19. $g[h(-3)]$

20. $h[f(10)]$

21. $f[h(8)]$

22. $[f \circ (h \circ g)](1)$

23. $[f \circ (g \circ h)](-2)$

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Practice

Operations on Functions

Find $(f + g)(x)$, $(f - g)(x)$, $(f \cdot g)(x)$, and $\left(\frac{f}{g}\right)(x)$ for each $f(x)$ and $g(x)$.

1. $f(x) = 2x + 1$

$g(x) = x - 3$

2. $f(x) = 8x^2$

$g(x) = \frac{1}{x^2}$

3. $f(x) = x^2 + 7x + 12$

$g(x) = x^2 - 9$

For each set of ordered pairs, find $f \circ g$ and $g \circ f$ if they exist.

4. $f = \{(-9, -1), (-1, 0), (3, 4)\}$

$g = \{(0, -9), (-1, 3), (4, -1)\}$

5. $f = \{(-4, 3), (0, -2), (1, -2)\}$

$g = \{(-2, 0), (3, 1)\}$

6. $f = \{(-4, -5), (0, 3), (1, 6)\}$

$g = \{(6, 1), (-5, 0), (3, -4)\}$

7. $f = \{(0, -3), (1, -3), (6, 8)\}$

$g = \{(8, 2), (-3, 0), (-3, 1)\}$

Find $[g \circ h](x)$ and $[h \circ g](x)$.

8. $g(x) = 3x$

$h(x) = x - 4$

9. $g(x) = -8x$

$h(x) = 2x + 3$

10. $g(x) = x + 6$

$h(x) = 3x^2$

11. $g(x) = x + 3$

$h(x) = 2x^2$

12. $g(x) = -2x$

$h(x) = x^2 + 3x + 2$

13. $g(x) = x - 2$

$h(x) = 3x^2 + 1$

If $f(x) = x^2$, $g(x) = 5x$, and $h(x) = x + 4$, find each value.

14. $f[g(1)]$

15. $g[h(-2)]$

16. $h[f(4)]$

17. $f[h(-9)]$

18. $h[g(-3)]$

19. $g[f(8)]$

20. $h[f(20)]$

21. $[f \circ (h \circ g)](-1)$

22. $[f \circ (g \circ h)](4)$

23. **BUSINESS** The function $f(x) = 1000 - 0.01x^2$ models the manufacturing cost per item when x items are produced, and $g(x) = 150 - 0.001x^2$ models the service cost per item. Write a function $C(x)$ for the total manufacturing and service cost per item.

24. **MEASUREMENT** The formula $f = \frac{n}{12}$ converts inches n to feet f , and $m = \frac{f}{5280}$ converts feet to miles m . Write a composition of functions that converts inches to miles.